

Working mode set parts and electronic apparatus

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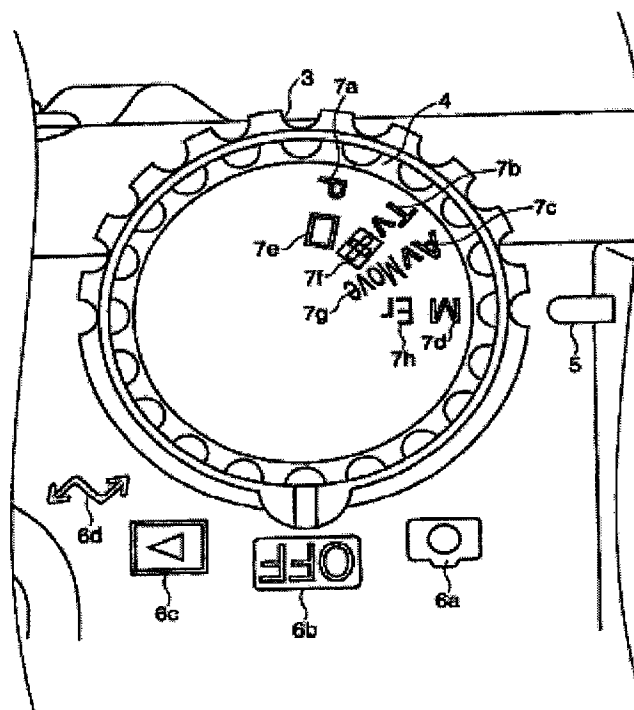
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It is an object of this invention to provide a setting operation device which can effectively cope with the tendency toward multiple functions and allows a user to easily change and check functions. In order to achieve this object, the device includes a first rotating unit which is rotated/operated to select at least a first upper operation mode and a second upper operation mode, and a second rotating unit which is rotated/operated to select a lower operation mode belonging to the first upper operation mode set by the first rotating unit and a lower operation mode belonging to the second upper operation mode set by the first rotating unit, the second rotating unit being stacked together with the first rotating unit.



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Working mode set parts and electronic apparatus

Claims of corresponding document:
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What is claimed is:

1. A setting operation device for setting an operation mode, comprising:
(A) a first rotating unit which is rotated/operated to select at least a first upper operation mode and a second upper operation mode; and
(B) a second rotating unit which is rotated/operated to select a lower operation mode belonging to the first upper operation mode set by said first rotating unit and a lower operation mode belonging to the second upper operation mode set by said first rotating unit, said second rotating unit being stacked together with said first rotating unit.
2. The device according to claim 1, wherein said first and second rotating units are arranged to be axially rotatable.
3. The device according to claim 1, wherein said second rotating unit is placed above said first rotating unit.
4. The device according to claim 3, wherein a rotational angle required for said second rotating unit to set the lower operation mode is larger than a rotational angle required for said first rotating unit to set the upper operation mode.
5. The device according to claim 3, wherein said second rotating unit is smaller in outer diameter than said first rotating unit.
6. The device according to claim 5, wherein a rotational angle required for said second rotating unit to set the lower operation mode is larger than a rotational angle required for said first rotating unit to set the upper operation mode.
7. The device according to claim 1, wherein a rotational angle required for said second rotating unit to set the lower operation mode is larger than a rotational angle required for said first rotating unit to set the upper operation mode.
8. The device according to claim 1, wherein said first rotating unit selects two of a photographing mode, a playback mode, and a communication mode as the first and second upper operation modes.
9. The device according to claim 1, further comprising a third rotating unit which is rotated/operated to select another lower operation mode belonging to the lower operation mode belonging to the first upper operation mode which is set by said second rotating unit, and another lower operation mode belonging to the lower operation mode belonging to the second upper operation mode and set by said second rotating unit, said third rotating unit being stacked together with said first and second rotating units.
10. The device according to claim 1, wherein indexes for the first upper operation mode and for the lower operation mode belonging to the first upper operation mode, and indexes for the second upper operation mode and for the lower operation mode belonging to the second upper operation mode are indicted in different colors.
11. An electronic apparatus for setting an operation mode, comprising:
(A) a first rotating unit which is rotated/operated to select at least a first upper operation mode and a second upper operation mode; and
(B) a second rotating unit which is rotated/operated to select a lower operation mode belonging to the first upper operation mode set by said first rotating unit and a lower operation mode belonging to the second upper operation mode set by said first rotating unit, said second rotating unit being stacked together with said first rotating unit.

12. The apparatus according to claim 11, wherein said first and second rotating units are arranged to be axially rotatable.
13. The apparatus according to claim 11, wherein said second rotating unit is placed above said first rotating unit.
14. The apparatus according to claim 13, wherein a rotational angle required for said second rotating unit to set the lower operation mode is larger than a rotational angle required for said first rotating unit to set the upper operation mode.
15. The apparatus according to claim 13, wherein said second rotating unit is smaller in outer diameter than said first rotating unit.
16. The apparatus according to claim 15, wherein a rotational angle required for said second rotating unit to set the lower operation mode is larger than a rotational angle required for said first rotating unit to set the upper operation mode.
17. The apparatus according to claim 11, wherein a rotational angle required for said second rotating unit to set the lower operation mode is larger than a rotational angle required for said first rotating unit to set the upper operation mode.
18. The apparatus according to claim 11, wherein said first rotating unit selects two of a photographing mode, a playback mode, and a communication mode as the first and second upper operation modes.
19. The apparatus according to claim 11, further comprising a third rotating unit which is rotated/operated to select another lower operation mode belonging to the lower operation mode belonging to the first upper operation mode which is set by said second rotating unit, and another lower operation mode belonging to the lower operation mode belonging to the second upper operation mode and set by said second rotating unit said third rotating unit being stacked together with said first and second rotating units.
20. The apparatus according to claim 11, wherein indexes for the first upper operation mode and for the lower operation mode belonging to the first upper operation mode, and indexes for the second upper operation mode and for the lower operation mode belonging to the second upper operation mode are indicted in different colors.
21. The apparatus according to claim 11, further comprising an image sensing apparatus.

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FIELD OF THE INVENTION

[0001] The present invention relates to a setting operation device for selecting an operation mode and the like in an electronic device such as an electronic camera and an electronic apparatus.

BACKGROUND OF THE INVENTION

[0002] In a conventional electronic device, e.g., an electronic camera, a dial is pivoted/operated to select an operation mode such as photographing operation of the camera and playback operation for a photographed image.

[0003] Recently, however, with the tendency toward multiple functions in an electronic camera, it has become difficult to indicate all operation modes of the camera on the dial. For this reason, operation modes that cannot be indicated on the dial are set and displayed on a display means such as an LCD that is used together with the dial. For this reason, a user needs to know in advance what types of functions the camera has. In addition, the user must repeatedly switch indications displayed by the display means or repeatedly operate dial to select a given function, and hence he/she cannot quickly change functions.

[0004] A general display means such as an LCD consumes a large amount of power. In addition, it is inconvenient for the user to use the display means so as to change and check functions.

SUMMARY OF THE INVENTION

[0005] The present invention has been made in consideration of the above situation, and has as its object to provide a setting operation device which can effectively cope with the tendency toward multiple functions and allows a user to easily change and check functions.

[0006] It is the second object of the present invention to improve the operability of the setting operation device of an electronic device.

[0007] In order to solve the above problem and achieve the above objects, a setting operation device according to the present invention is characterized by having the following arrangement.

[0008] There is provided a setting operation device for setting an operation mode, comprising a first rotating unit which is rotated/operated to select at least a first upper operation mode and a second upper operation mode, and a second rotating unit which is rotated/operated to select a lower operation mode belonging to the first upper operation mode set by the first rotating unit and a lower operation mode belonging to the second upper operation mode set by the first rotating unit, the second rotating unit being stacked together with the first rotating unit.

[0009] An electronic apparatus according to the present invention is characterized by having the following arrangement.

[0010] There is provided an electronic apparatus for setting an operation mode, comprising a first rotating unit which is rotated/operated to select at least a first upper operation mode and a second upper-operation mode, and a second rotating unit which is rotated/operated to select a lower operation mode belonging to the first upper operation mode set by the first rotating unit and a lower operation mode belonging to the second upper operation mode set by the first rotating unit, the second rotating unit being stacked together with the first rotating unit.

[0011] Other objects and advantages besides those discussed above shall be apparent to those skilled in the art from the description of a preferred embodiment of the invention which follows. In the description, reference is made to accompanying drawings, which form a part thereof, and which illustrate an example of the invention. Such example, however, is not exhaustive of the various embodiments of the invention, and therefore reference is made to the claims which follow the description for determining the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIGS. 1A and 1B are upper and front views of an electronic camera according to the first embodiment of the present invention;

[0013] FIG. 2 is an enlarged view of the first and second mode dials of the electronic camera according to the first embodiment of the present invention;

[0014] FIGS. 3A to 3C are views showing the internal structure of the first mode dial of the electronic

camera according to the first embodiment of the present invention and its function;

[0015] FIG. 4 is an exploded perspective view of the dial portion of the electronic camera according to the first embodiment of the present invention;

[0016] FIGS. 5A and 5B are plan views showing the electrode pattern of the electronic camera according to the first embodiment of the present invention;

[0017] FIG. 6 is a view showing the schematic arrangement of an electronic recording/playback apparatus according to the first embodiment of the present invention;

[0018] FIG. 7 is an enlarged view of the dial portion of the electronic recording/playback apparatus according to the first embodiment of the present invention;

[0019] FIG. 8 is a view showing the relationship between the operation modes of the electronic camera and connection among the electrodes; and

[0020] FIGS. 9A to 9D are views showing the internal structure of the first mode dial of the electronic camera according to the second embodiment of the present invention and its function.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] The preferred embodiments of the present invention will be described below with reference to the accompanying drawings.

[0022] (First Embodiment)

[0023] FIGS. 1A and 1B show the front and upper surfaces of an electronic camera according to the first embodiment of the present invention. Referring to FIGS. 1A and 1B, reference numeral 1 denotes a photographic lens; 2, the casing of the electronic camera; and 3, a first mode dial that is pivoted to select an operation mode for the electronic camera, e.g., an inactive mode, photographing mode, or playback mode, and has an index 3a for indicating the currently selected operation mode. The first mode dial 3 protrudes from the casing 2 in the radial direction to allow the user to pivot the dial with his/her finger tip or the like by putting it on the protruding portion.

[0024] Reference numeral 4 denotes a second mode dial that is pivoted to select a photograph mode in photograph operation, e.g., an AV priority (aperture priority) mode, TV priority (shutter priority) mode, or programmed mode. The second mode dial 4 is smaller in diameter than the first mode dial 3, and has a pivot center coinciding with the pivot center of the first mode dial 3. The second mode dial 4 is stacked on the first mode dial. Reference numeral 5 denotes an index for indicating the photographing mode selected by the second mode dial 4.

[0025] FIG. 2 is an enlarged view of the first mode dial 3 and second mode dial 4. Referring to FIG. 2, reference numeral 6a to 6d denote indications of operation modes that can be selected by the first mode dial 3, which respectively indicate the photographing mode, inactive mode (power OFF), playback mode, and communication mode in different colors.

[0026] Reference numerals 7a to 7h denote indications of the contents of photographing modes and playback modes that can be selected by the second mode dial 4. More specifically, reference numeral 7a denotes the programmed photographing mode; 7b, the TV priority mode; 7c, the AV priority mode; and 7d, the manual mode. These modes are displayed in the same color as that of the photographing mode 6a.

[0027] Reference numeral 7e denotes a single playback mode; 7f, a multi-playback mode, 7g, a moving image playback mode, and 7h, an erase mode. These modes are displayed in the same color as the display color of the playback mode 6c.

[0028] Referring to FIG. 1, reference numeral 8 denotes an information display unit for displaying information such as a remaining frame count, aperture value, shutter speed, remaining battery capacity, and the like; and 9, a release button that is operated to generate a release signal. Assume that in this embodiment, no lower mode to be selected in the communication mode is set.

[0029] FIGS. 3A to 3C are views showing the internal structure of the first mode dial 3. Referring to FIGS. 3A to 3C, reference numeral 10 denotes a fixing portion which is part of the casing 2 and supports the first mode dial 3; and 11, a leaf spring which is supported by the fixing portion 10 and in contact with a serrated portion 3b formed inside the first mode dial 3.

[0030] With the above structure of the first mode dial 3, when the first mode dial 3 is pivoted from the state shown in FIG. 3A in the direction indicated by the arrow, the leaf spring 11 is charged by a projection of the serrated portion 3b, as shown in FIG. 3B. When the first mode dial 3 is further pivoted, the leaf spring 11 comes into contact with the next recess owing to the charging force of the leaf spring 11, as shown in FIG. 3C. As the leaf spring 11 sequentially passes through recesses and projections in this manner, the user can feel clicks when he/she pivots the first mode dial 3. The second mode dial 4 has substantially the same structure as that of the first mode dial 3.

[0031] FIG. 4 is an exploded perspective view showing the structures of the first mode dial 3 and second mode dial 4 in more detail. Referring to FIG. 4, reference numeral 12 denotes a flexible printed board on which a concentric electrode pattern is drawn around the pivot center of the first mode dial 3 and second

mode dial 4; and 13 and 14, contact pieces which are in contact with the electrode pattern on the flexible printed board 12 and fixed on contact piece bases 15 and 16 that pivot about the center of the concentric pattern.

[0032] Reference numeral 17 denotes a base plate on which the flexible printed board 12 and contact piece bases 15 and 16 are mounted. The base plate 17 has a pivot shaft 17a on which the contact base 16 is pivoted. The center axis of this pivot shaft 17a coincides with the pivot centers of the first mode dial 3, second mode dial 4, and contact piece bases 15 and 16. The contact piece bases 15 and 16 are respectively engaged with the first mode dial 3 and second mode dial 4, so that as the first and second mode dials 3 and 4 pivot, the bases also pivot in the same manner.

[0033] FIGS. 5A and 5B are views for explaining the operation of the electrode pattern on the flexible printed board 12 and contact pieces 13 and 14. Referring to FIGS. 5A and 5B, reference numeral 18 denotes an electrode, and reference symbols A, B, C, D, E, F, and G denote electrodes. The system controller (not shown) of the electronic camera detects connection between the electrode 18 and the electrodes A, B, C, D, E, F, and G. Assume that the contact piece 13 pivots from the state shown in FIG. 5A to the state shown in FIG. 5B as the first mode dial 3 pivots, and connection between the electrodes A, B, and C and the electrode 18 changes. In this case, the system controller changes the inactive mode to the photographing mode.

[0034] FIG. 8 shows the relationship between the operation modes of the electronic camera and connection between the electrodes A, B, C, D, E, F, and G and the electrode 18. The system controller (not shown) switches the operation modes in accordance with connection between the electrodes A, B, C, D, E, F, and G and the electrode 18, as shown in FIG. 8.

[0035] As described above, in this embodiment, the operation modes are displayed in different colors such that lower photographing modes and playback modes are displayed in colors corresponding to the colors of the corresponding upper operation modes. This allows the user to easily switch the operation modes of the electronic camera and check the current operation mode of the camera.

[0036] In this embodiment, the two dials are coaxially stacked on each other. However, the present invention is not limited to this. That is, three or more dials can be coaxially stacked on each other. In this case, more lower operation modes can be set. This allows the user to set operation modes more elaborately.

[0037] FIG. 6 is an external view of an electronic image recording/playback apparatus according to an embodiment of the present invention. Referring to FIG. 6, reference numeral 101 denotes an electronic image recording/playback apparatus body including a personal computer and the like; and 102, a first dial for selecting one of operation modes of the electronic image recording/playback apparatus, i.e., the inactive mode, playback mode, record mode, and print mode. Note that the operation mode selected by the first dial 102 will be referred to as a first operation mode. Reference numeral 103 denotes a second dial for selecting one of a standard mode, monotone mode, sharpness change mode, brightness change mode, contrast change mode, and color tone change mode as lower modes in the playback mode, record mode, and print mode which are the first operation modes (to be described later).

[0038] Reference numeral 104 denotes a third dial for setting a degree of change when one of the sharpness change mode, brightness change mode, contrast change mode, and saturation change mode is selected by the second dial 103.

[0039] Reference numeral 105 denotes a display means for displaying image data and the like; 106, an interface for inputting/outputting image data and the like; 107 and 108, operation units for changing the image data and the like displayed on the display means 105; 109, a decision button for starting to record or print in the record mode or print mode; and 110, a printer for printing information such as an image.

[0040] FIG. 7 is a view showing the first dial 102, second dial 103, and third dial 104 in detail. Referring to FIG. 7, reference numerals 111 to 114 denote the indications of operation modes selected by the first dial 102. More specifically, reference numeral 111 denotes the playback mode of displaying an image or the like; 112, the record mode of recording an image or the like; 113, the print mode of printing an image or the like; and 114, a power OFF indication. In this case, the operation mode in the direction of an index 102a formed on the first dial 102 is selected. For example, in the case shown in FIG. 7, the playback mode is selected.

[0041] Reference numerals 115 to 120 denote the indications of the operation modes set by the second dial 103. More specifically, reference numeral 115 denotes the standard mode of playing back, recording, and printing an image or the like with predetermined set values; 116, the monotone mode of playing back, recording, and printing an image or the like by converting it into a monochrome image; 117, the sharpness change mode of playing back, recording, and printing an image or the like upon changing sharpness; 118, the brightness change mode of playing back, recording, and printing an image or the like upon changing brightness; 119, the contrast change mode of playing back, recording, and printing an image or the like upon changing contrast; and 120, the saturation change mode of playing back, recording, and printing an image or the like upon changing saturation.

[0042] The third dial 104 becomes effective when one of the sharpness, brightness, contrast, and saturation modes is selected by the second dial 103. Each degree of change is represented by a positive/negative numerical value.

[0043] The third dial 104 is located above the second dial 103 and smaller in outer diameter than the second dial 103.

[0044] Reference numeral 121 denotes a second index for the second dial 103. The second mode represented by the indication facing the second index 121 (sharpness in FIG. 7) is selected. Reference numeral 122 denotes a third index for the third dial 104. The degree of change in sharpness, brightness, contrast, or saturation is determined in accordance with a numerical value displayed on the third dial 104 which faces this third index 122. In the case shown in FIG. 7, the sharpness of the currently played image or the like is increased by two steps, and the resultant image is displayed on the display means 105.

[0045] As described above, according to this embodiment, in the operation mechanism of an electronic device of this type, the operation unit itself indicates an operation mode, and hence the user can easily know the current operation mode. In addition, even if the electronic device is inactive, lower modes can be set in advance. Therefore, when the electronic device is activated, a desired operation state can be quickly set.

[0046] Furthermore, since the first operation unit protrudes from the casing of the electronic device and the outer diameter of the second operation units is smaller than that of the first operation unit, the operation of the first operation unit is facilitated. This prevents the user from erroneously operating the second operation unit.

[0047] (Second Embodiment)

[0048] In the second embodiment, operation pivot angles are set for the first to third operation dials in the first embodiment in such a manner that a larger pivot angle is set for a dial located at a higher level. Since the other arrangements of the second embodiment are the same as those of the first embodiment, only the difference between the first and second embodiments will be described.

[0049] In the second embodiment, referring to FIG. 2, the minimum operation angle of a second mode dial 4 is larger than that of a first mode dial 3, and hence the above indications 7a to 7h can be displayed on the dial in proper sizes.

[0050] FIGS. 9A to 9C are views showing the internal structure of the first mode dial 3. Referring to FIGS. 9A to 9C, reference numeral 10 denotes a fixing portion which is part of a casing 2 and supports the first mode dial 3; and 11, a leaf spring which is supported by the fixing portion 10 and in contact with a serrated portion 3b, formed inside the first mode dial 3.

[0051] With the above structure of the first mode dial 3, when the first mode dial 3 is pivoted from the state shown in FIG. 9A in the direction indicated by the arrow, the leaf spring 11 is charged by a projection of the serrated portion 3b, as shown in FIG. 9B. When the first mode dial 3 is further pivoted, the leaf spring 11 comes into contact with the next recess owing to the charging force of the leaf spring 11, as shown in FIG. 9C. As the leaf spring 11 sequentially passes through recesses and projections in this manner, the user can feel clicks when he/she pivots the first mode dial 3.

[0052] The second mode dial 4 also has substantially the same structure as the first mode dial 3. However, as shown in FIG. 9D, the period of a serrated portion 4a formed on the second mode dial 4 is longer than that of the serrated portion 3b of the first mode dial 3. The pivot angle at which the leaf spring 11 pivots upon climbing over one projection of the serrated portion is larger than that in the case of the first mode dial 3.

[0053] By setting the pitch of the serrated engaging portion of the second mode dial 4 to be smaller than that of the serrated engaging portion of the first mode dial 3, the pivot angle required for the operation of the second mode dial 4 can be set to be larger than that for the first mode dial 3. This makes it possible to ensure a large mode display portion on the second mode dial 4 and improve its visibility.

[0054] According to the second embodiment, in the electronic image recording/playback apparatus shown in FIG. 6 as well, the minimum operation angle of a first dial 102 is set to be smaller than that of a second dial 103, and the minimum operation angle of the second dial 103 is set to be smaller than that of a third dial 104.

[0055] As described above, according to the second embodiment, in the operation mechanism of an electronic device of this type, the operation unit itself indicates an operation mode, and hence the user can easily know the current operation mode. In addition, even if the electronic device is inactive, lower modes can be set in advance. Therefore, when the electronic device is activated, a desired operation state can be quickly set. In addition, since a larger operation angle is set for a operation dial located at a higher level, a sufficiently large size can be ensured for an indication indicating the operation mode to be changed on the upper side.

[0056] Furthermore, since the first operation unit protrudes from the casing of the electronic device and the outer diameter of the second operation units is smaller than that of the first operation unit, the operation of the first operation unit is facilitated. This prevents the user from erroneously operating the second operation

unit.

[0057] The present invention is not limited to the above embodiments and various changes and modifications can be made within the spirit and scope of the present invention. Therefore, to apprise the public of the scope of the present invention, the following claims are made.

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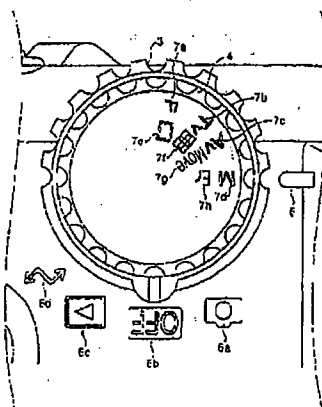
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[54] 发明名称 工作模式设定部件和电子装置

[57] 摘要

本发明的目的在于提供一种能有效地与多功能的发展趋势合拍、并使用户易于改变和检查其功能的工作模式设定部件。为达到此目的,该部件包括第一转动单元和第二转动单元,转动/操作所述第一转动单元,以选择至少一第一高级工作模式和一第二高级工作模式;转动/操作所述第二转动单元,以选择一属于由所述第一转动单元所设定的所述第一高级工作模式的低级工作模式和一属于由所述第一转动单元所设定的所述第二高级工作模式的低级工作模式,所述的第二转动单元与所述的第一转动单元相重叠。



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权 利 要 求 书

- 1、一种用于设定工作模式的工作模式设定部件，包括：
 - (A) 第一转动单元，转动/操作它，以选择至少一第一高级工作模式和一第二高级工作模式；和
 - (B) 第二转动单元，转动/操作它，以选择一属于由所述第一转动单元所设定的所述第一高级工作模式的低级工作模式和一属于由所述第一转动单元所设定的所述第二高级工作模式的低级工作模式，所述的第二转动单元与所述的第一转动单元相重叠。
- 2、如权利要求 1 所述的部件，其中可同轴转动地设置所述的第一和第二转动单元。
- 3、如权利要求 1 所述的部件，其中所述的第二转动单元位于所述的第一转动单元之上。
- 4、如权利要求 3 所述的部件，其中所述第二转动单元为设定所述的低级工作模式而需要的转角大于所述第一转动单元为设定所述的高级工作模式而需要的转角。
- 5、如权利要求 3 所述的部件，其中所述第二转动单元的外径小于所述第一转动单元的外径。
- 6、如权利要求 5 所述的部件，其中所述第二转动单元为设定所述的低级工作模式而需要的转角大于所述第一转动单元为设定所述的高级工作模式而需要的转角。
- 7、如权利要求 1 所述的部件，其中所述第二转动单元为设定所述的低级工作模式而需要的转角大于所述第一转动单元为设定所述的高级工作模式而需要的转角。
- 8、如权利要求 1 所述的部件，其中所述第一转动单元选择拍摄模式、回放模式和通讯模式中的两个作为所述的第一和第二高级工作模式。
- 9、如权利要求 1 所述的部件，还包括一第三转动单元，转动/操作它，以选择属于第一高级工作模式中的低级工作模式的另一低级工作模式和属于第二高级工作模式中的低级工作模式的另一低级工作模式。前述的第一高级工作模式由所述的第二转动单元所设，前述的第二高级工作模式由所述的第二转动单元所

设, 所述的第三转动单元与所述第一和第二转动单元相重叠。

10、如权利要求 1 所述的部件, 其中用不同的颜色表示所述第一高级工作模式与属于所述第一高级工作模式的所述低级工作模式的符号和所述第二高级工作模式与属于所述第二高级工作模式的所述低级工作模式的符号。

11、一种用于设定工作模式的电子装置, 包括:

(A) 第一转动单元, 转动/操作它, 以选择至少一第一高级工作模式和一第二高级工作模式; 和

(B) 第二转动单元, 转动/操作它, 以选择一属于由所述第一转动单元所设定的所述第一高级工作模式的低级工作模式和一属于由所述第一转动单元所设定的所述第二高级工作模式的低级工作模式, 所述的第二转动单元与所述的第一转动单元相重叠。

12、如权利要求 11 所述的装置, 其中可同轴转动地设置所述的第一和第二转动单元。

13、如权利要求 11 所述的装置, 其中所述的第二转动单元位于所述的第一转动单元之上。

14、如权利要求 13 所述的装置, 其中所述第二转动单元为设定所述的低级工作模式而需要的转角大于所述第一转动单元为设定所述的高级工作模式而需要的转角。

15、如权利要求 13 所述的装置, 其中所述第二转动单元的外径小于所述第一转动单元的外径。

16、如权利要求 15 所述的装置, 其中所述第二转动单元为设定所述的低级工作模式而需要的转角大于所述第一转动单元为设定所述的高级工作模式而需要的转角。

17、如权利要求 11 所述的装置, 其中所述第二转动单元为设定所述的低级工作模式而需要的转角大于所述第一转动单元为设定所述的高级工作模式而需要的转角。

18、如权利要求 11 所述的装置, 其中所述第一转动单元选择拍摄模式、回放模式和通讯模式中的两个作为所述的第一和第二高级工作模式。

19、如权利要求 11 所述的装置, 还包括一第三转动单元, 转动/操作它, 以选择属于第一高级工作模式中的低级工作模式的另一低级工作模式和属于第二

高级工作模式中的低级工作模式的另一低级工作模式，前述的第一高级工作模式由所述的第二转动单元所设，前述的第二高级工作模式由所述的第二转动单元所设，所述的第三转动单元与所述第一和第二转动单元相重叠。

20、如权利要求 11 所述的装置，其中用不同的颜色表示所述第一高级工作模式与属于所述第一高级工作模式的所述低级工作模式的符号和所述第二高级工作模式与属于所述第二高级工作模式的所述低级工作模式的符号。

21、如权利要求 11 所述的装置，还包括一图象传感装置。

说明书

工作模式设定部件和电子装置

本发明涉及一种用于在例如电子照相机的电子仪器中进行工作模式的选择等的工作模式设定部件和一种电子装置。

在例如电子照相机的传统电子仪器中，是通过转动/操作字盘来选择工作模式的，例如：相机的拍摄操作和对已拍摄的图象进行回放的操作。

但近来，随着电子照相机向多功能方向发展，要在字盘上表示出所有的工作模式已变得很难。因此，就把那些不能在字盘上表示出的工作模式设定和显示到例如 LCD 的显示器上，并与字盘一起使用。据此，用户需要事先获知该照相机的功能类型。而且，用户还必须重复操作该字盘以选择所给定的功能，因而他/或她不能快速改换功能。

象 LCD 这样的常规显示器需要耗费大量的能源。并且，对于用户来说，利用显示器来变换和检查功能很不方便。

本发明已经考虑到以上的情况，且其目的在于：提供一种能有效地与多功能的发展趋势相合拍，并使用户易于变换和检查其功能的工作模式设定部件。

本发明的第二目的在于：改善电子器件中工作模式设定部件的可操作性。

为解决上述的问题和实现上述的发明目的，本发明的工作模式设定部件具有以下配置特征。

一种用于设定工作模式的工作模式设定部件，包括：一个第一转动单元和一个第二转动单元，其中：通过转动/操作第一转动单元可以至少选择一个第一高级工作模式和一个第二高级工作模式；通过转动/操作第二转动单元可以选择一个第一低级工作模式和一个第二低级工作模式。所述的第一低级工作模式属于由第一转动单元设定的第一高级工作模式，所述的第二低级工作模式属于由第一转动单元设定的第二高级工作模式。所述的第二转动单元和所述的第一转动单元重叠在一起。

本发明的电子器件具有以下配置特征。

一种用于设定工作模式的电子器件，包括：一个第一转动单元和一个第二转动单元，其中：通过转动/操作第一转动单元可以至少选择一个第一高级工作模

式和一个第二高级工作模式；通过转动/操作第二转动单元可以选择一个第一低级工作模式和一个第二低级工作模式，所述的第一低级工作模式属于由第一转动单元设定的第一高级工作模式，所述的第二低级工作模式属于由第一转动单元设定的第二高级工作模式；所述的第二转动单元和所述的第一转动单元重叠在一起。

除了以上所述的发明目的和优点以外，所述技术领域的技术人员将从以下对本发明的一个优选实施例的描述中清楚其它的目的和优点。在描述中，将结合作为其一部分的附图，且该附图举出了本发明的一个例子。但这样的举例不能穷尽本发明的各种实施例，因此，在该说明书之后所作的权利要求书将确定本发明的保护范围。

图 1A 和 1B 是本发明第一实施例的电子照相机的上部和前部示图；

图 2 是本发明第一实施例的电子照相机的第一和第二模式字盘的放大示图；

图 3A 至 3C 示意了本发明第一实施例的电子照相机的第一模式字盘的内部结构和其功能；

图 4 是本发明第一实施例的电子照相机的字盘部分的分解透视图；

图 5A 和 5B 是本发明第一实施例的电子照相机的电极结构的平面图；

图 6 示意了本发明第一实施例的电子记录/回放器件的配置图；

图 7 是本发明第一实施例的电子记录/回放器件的字盘部分的放大图；

图 8 示意了电子照相机的各工作模式与各电极之间的连接关系图；和

图 9A 至 9D 示意了本发明第二实施例的电子照相机的第一模式字盘的内部结构和功能。

以下将结合附图对本发明的优选实施例进行描述。

(第一实施例)

图 1A 和 1B 示意了本发明第一实施例的电子照相机的前表面和上表面。参见图 1A 和 1B，附图标记 1 表示摄影镜头；2 表示电子照相机壳；3 表示第一模式字盘，转动它就可以为该电子照相机选择一工作模式，例如：静止模式、拍摄模式或回放模式，其中的 3a 用于表示目前所选的工作模式。第一模式字盘 3 以径向从机壳 2 中突出，使得用户可以通过把他/她的指尖等放在所述的突出部位而转动该字盘。

附图标记 4 表示第二模式字盘，转动它就可以选择一个拍摄操作的拍摄模式，

例如: AV 优先(孔径优先)模式、TV 优先(快门优先)模式或程控模式。第二模式字盘 4 的尺寸比第一模式字盘 3 小, 且它的轴心与第一模式字盘 3 的轴心相重合。第二模式字盘 4 重叠在第一模式字盘 3 之上。附图标记 5 表示由第二模式字盘 4 所选择的拍摄模式指针。

图 2 是第一模式字盘 3 和第二模式字盘 4 的放大图。参见图 2, 附图标记 6a 至 6d 指能由第一模式字盘 3 选择的工作模式标记, 它们以不同的颜色分别指示拍摄模式、静止模式(关机)、回放模式和通讯模式。

附图标记 7a 至 7h 指拍摄模式和回放模式的内容标记, 它们都是能由第二模式字盘 4 选择的模式。特别地, 附图标记 7a 指程控拍摄模式; 附图标记 7b 指 TV 优先模式; 附图标记 7c 指 AV 优先模式; 附图标记 7d 指手动模式。这些模式用与拍摄模式 6a 中相同的颜色表示。

附图标记 7e 指单个回放模式; 附图标记 7f 指多个回放模式; 附图标记 7g 指动态图象回放模式和附图标记 7h 指删除模式。这些模式用与拍摄模式 6c 中相同的颜色表示。

参见图 1, 附图标记 8 指信息显示单元, 它显示例如余帧量、孔径、快门速度、电池余量等的信息; 附图标记 9 指断开按钮, 一按它, 就可以产生一断开信号。假定在本实施例中, 通讯模式中没有设置可被选择的较低模式。

附图 3A 至 3C 示意了第一模式字盘 3 的内部结构。参见图 3A 至 3C, 附图标记 10 指一固定件, 它是外壳 2 的一部分且支撑该第一模式字盘 3; 附图标记 11 指一叶状弹簧, 它由所述的固定件 10 支撑且与第一模式字盘 3 内形成的一齿状部 3b 相接。

由于第一模式字盘 3 具有以上所述的结构, 所以, 当以箭头所示的方向把第一模式字盘 3 从图 3A 所示的状态进行转动时, 齿状部 3b 的突出部将带动叶状弹簧 11, 如图 3B 所示。当进一步转动第一模式字盘 3 时, 叶状弹簧 11 在该叶状弹簧 11 所受拉力作用下逐渐与下一个凹部相接, 如图 3C 所示。随着该叶状弹簧 11 以这种方式相继通过凹部和突出部, 用户可以感受到他/她转动第一模式字盘 3 时所产生的咔嚓声。第二模式字盘 4 几乎具有与第一模式字盘 3 相同的结构。

图 4 是第一模式字盘 3 和第二模式字盘 4 的详细结构的分解透视图。参见图 4, 附图标记 12 指一个柔性印刷板, 其上沿第一模式字盘 3 和第二模式字盘 4

的轴心伸出一同心电极结构；附图标记 13 和 14 都是接触片，它们与该柔性印刷板 12 上的电极结构相接触，并固定在接触片底座 15 和 16 上，底座 15 和 16 可相对于该同心结构的中心转动。

附图标记 17 指一基板，其上安装柔性印刷板 12 和接触片底座 15 和 16。该基板 17 具有一转轴 17a，接触底座 16 可在其上转动，转轴 17a 的中轴与第一模式字盘 3、第二模式字盘 4 和接触片底座 15 和 16 的转动中心相一致。接触片底座 15 和 16 分别与第一模式字盘 3 和第二模式字盘 4 相连，所以，当第一和第二模式字盘 3 和 4 转动时，该底座也以同样的方式转动。

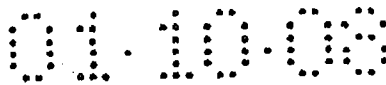
图 5A 和 5B 是用于说明柔性印刷板 12 上的电极结构与接触片 13 和 14 的工作过程的示意图。参见图 5A 和 5B，附图标记 18 指一电极，符号 A、B、C、D、E、F 和 G 指多个电极。电子照相机的系统控制器（未示出）检测电极 18 与各电极 A、B、C、D、E、F 和 G 之间的连接关系。假定，接触片 13 随着第一模式字盘 3 的转动而从图 5A 所示的状态转动到图 5B 所示的状态，且电极 A、B、C、D、E、F 和 G 与电极 18 之间的连接关系也改变。在这种情况下，系统控制器把静止模式改为拍摄模式。

图 8 示意了电子照相机的工作模式与各电极 A、B、C、D、E、F 和 G 同电极 18 之间的连接关系之间的联系。系统控制器（未示出）将根据图 8 所示的各电极 A、B、C、D、E、F 和 G 与电极 18 之间的连接关系来转换工作模式。

如上所述，在该实施例中，用不同的颜色表示了各工作模式，用与表示相应的高级模式相同的颜色来表示相应的低级拍摄模式和回放模式。这使得用户易于转换电子照相机的工作模式和检查该相机目前的工作模式。

在该实施例中，所述的两个字盘是相互同轴重叠在一起的。但是，本发明并不限于此，即，可以是三个或更多的字盘同轴重叠。此时，可以设定更多的低级工作模式。这使得用户可以更精细地设定工作模式。

图 6 是本发明一实施例的电子图象记录/回放装置的外观图。参见图 6，附图标记 101 指一含有个人电脑等的电子图象记录/回放装置主体，附图标记 102 指第一字盘，它用于选择该电子图象记录/回放装置的一工作模式，例如：静止模式、回放模式、记录模式和打印模式。注意，由第一字盘 102 选择的工作模式将作为一第一工作模式。附图标记 103 指一第二字盘，它用于选择以下模式中的一种，即：作为回放模式的低级模式的一标准模式、单色模式、锐度改变模式、



亮度改变模式、对比度改变模式和色调改变模式、记录模式、以及打印模式，它们都是第一工作模式（后面将对其描述）。

附图标记 104 指—第三字盘，当用第二字盘 103 选择锐度改变模式、亮度改变模式、对比度改变模式和色饱和度改变模式之一时，所述的第三字盘用于设定其改变量。

附图标记 105 指—显示装置，用于显示图象数据等；附图标记 106 指—接口，用于输入/输出图象数据等；附图标记 107 和 108 指工作单元，它们用于改变显示在显示装置 105 上的图象数据等；附图标记 109 指—确定按钮，在记录模式或打印模式中用于启动记录或打印；附图标记 110 指—用于打印图象等打印信息的打印机。

图 7 详细表示了第一字盘 102、第二字盘 103 和第三字盘 104。参见图 7，附图标记 111 至 114 指由第一字盘 102 所选的工作模式符号，特别地，附图标记 111 指显示图象等的回放模式，附图标记 112 指记录图象等的记录模式，附图标记 113 指打印图象等的打印模式，附图标记 114 指示关机状态。在此情形下，选择第一字盘 102 上形成的方向标识 102a 中的工作模式。例如，在图 7 所示的情形中，选择回放模式。

附图标记 115 至 120 指由第二字盘 103 设定的工作模式符号。特别地，附图标记 115 指具有预定值的图象回放、记录和打印等标准模式；附图标记 116 指通过把图象转换成单色图象而进行的图象回放、记录和打印等单色模式；附图标记 117 指通过改变锐度而进行的图象回放、记录和打印等锐度改变模式；附图标记 118 指通过改变亮度而进行的图象回放、记录和打印等亮度改变模式；附图标记 119 指通过改变对比度而进行的图象回放、记录和打印等对比度改变模式；附图标记 120 指通过改变饱和度而进行的图象回放、记录和打印等饱和度改变模式。

在由第二字盘 103 选择锐度、亮度、对比度和饱和度模式之一时，第三字盘 104 就变得有效了，用一个正值/负值来表示各个改变量。

第三字盘 104 位于第二字盘 103 之上，且它的外径小于第二字盘 103 的外径。

附图标记 121 指第二字盘 103 的第二指针，选择由第二指针 121 面向的符号所表示的第二模式（图 7 中的锐度）。附图标记 122 指第三字盘 104 的第三指针，根据第三字盘 104 上所示的数值来确定锐度、亮度、对比度或饱和度的改变量，

其中所述的数值面向第三指针 122。在图 7 所示的情形中，目前所放图象的锐度等经两个步骤后增加，且最后的图象显示在显示装置 105 上。

如上所述，根据本实施例，在这种类型的电子仪器的工作过程中，工作单元本身就表示一种工作模式。由此用户能够很容易就得知目前的工作模式。而且，即使该电子仪器处于非工作状态，也可以预设其低级模式。因而，在打开该电子仪器时，能够很快地设定所需的工作状态。

另外，由于第一工作单元从该电子仪器的外壳中伸出，且第二工作单元的外径小于第一工作单元的外径，所以，第一工作单元的操作得以简化，这就避免了用户对第二工作单元的错误操作。

(第二实施例)

在第二实施例中，是用这样的方式给第一实施例中的第一至第三工作字盘设定工作转角的，即，给位于较高位置的字盘设定较大的转角。由于第二实施例中的其它设置与第一实施例中的相同，所以，将仅描述第一和第二实施例中的区别。

在实施例 2 中，参见图 2，第二模式字盘 4 的最小工作角大于第一模式字盘 3 的最小工作角，从而可以在字盘上以适当的大小显示上述的符号 7a 至 7h。

图 9A 至 9C 示意了第一模式字盘 3 的内部结构。参见图 9A 至 9C，附图标记 10 指作为外壳 2 的一部分且用于支撑第一模式字盘 3 的一固定部分，附图标记 11 指一叶状弹簧，它由该固定部分 10 支撑且与第一模式字盘 3 中所形成的齿状部 3b 相连。

由于所述的第一模式字盘 3 的上述结构，所以，当第一模式字盘 3 从图 9A 所示的状态沿箭头所示方向转动时，所述的叶状弹簧 11 由所述的齿状部 3b 的突起所牵引，如图 9B 所示。当继续转动第一模式字盘 3 时，所述的叶状弹簧 11 将由于该叶状弹簧 11 所受的牵引而与下一个凹陷相接，如图 9C 所示。随着该叶状弹簧 11 以所述方式相继经过突起和凹陷，用户就可以感觉到在他/她转动第一模式字盘 3 时所产生的咔嚓声。

第二模式字盘 4 也具有几乎与第一模式字盘 3 相同的结构。但是，如图 9D 所示，在第二模式字盘 4 上所形成的齿状部 4a 的间距比在第一模式字盘 3 上所形成的齿状部 3a 的间距长。该叶状弹簧 11 依赖其转动而爬过齿状部的一突起的转角大于第一模式字盘 3 的同种参数。

通过把第二模式字盘 4 的齿状啮合部的螺距设定得比第一模式字盘 3 的齿状

啮合部的螺距小，而使操作第二模式字盘 4 所需的转角可以设定得比操作第一模式字盘 3 所需的转角大。这就可以在第二模式字盘 4 上取得一个较大的模式显示区域，并改善它的可视性。

根据第二实施例，以及在图 6 所示的电子图象记录/回放装置中，把第一字盘 102 的最小工作角设定得比第二字盘 103 的小，且把第二字盘 103 的最小工作角设定得比第三字盘 104 的小。

如上所述，根据第二实施例，在这种类型的电子仪器的操作部件中，操作单元本身就表示一种工作模式，所以，用户可以很容易就得知目前的工作模式。并且，即使该电子仪器处于非工作状态，也可以预设较低级的模式。因此，当打开该电子仪器时，能够很快地设定所需的工作状态。而且，由于可以为位于较高位置的操作盘设置一个较大的操作角度，所以，能够为位于上部的、用于指示将被改变的工作模式的符号提供一足够大的尺寸。

另外，由于第一工作单元从该电子仪器的外壳中伸出，且第二工作单元的外径小于第一工作单元的外径，所以，第一工作单元的操作得以简化，这就避免了用户对第二工作单元的错误操作。

本发明不限于上述的实施例，且可以在本发明的精神和范围内进行各种替换和修改，因此，为把本发明的保护范围告知公众，作出了如下的权利要求书。

01.10.08

说明书附图

图 1A

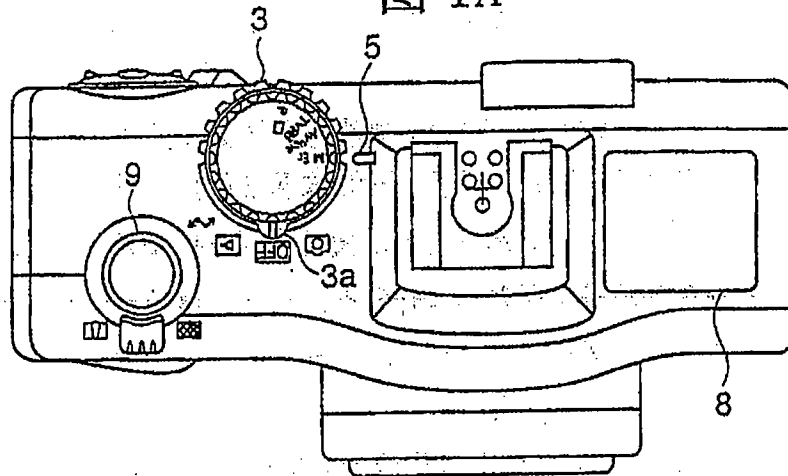
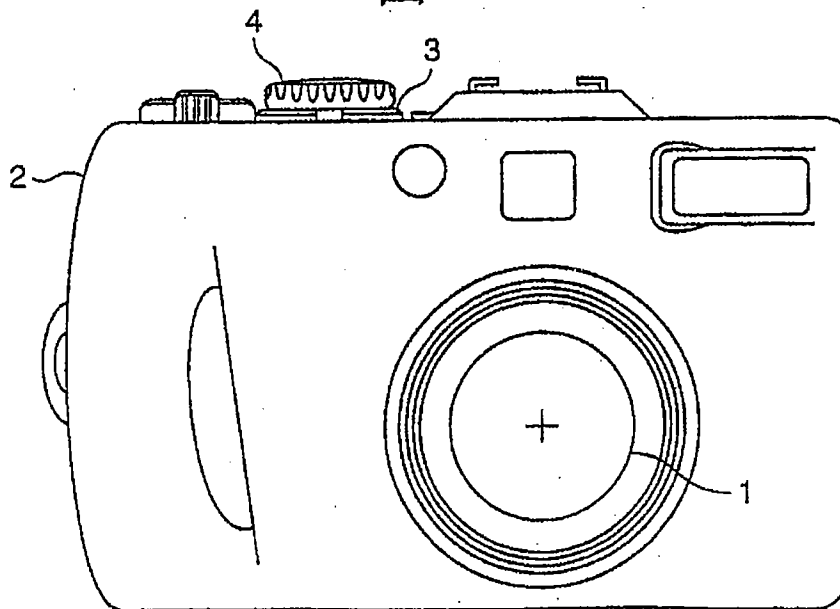
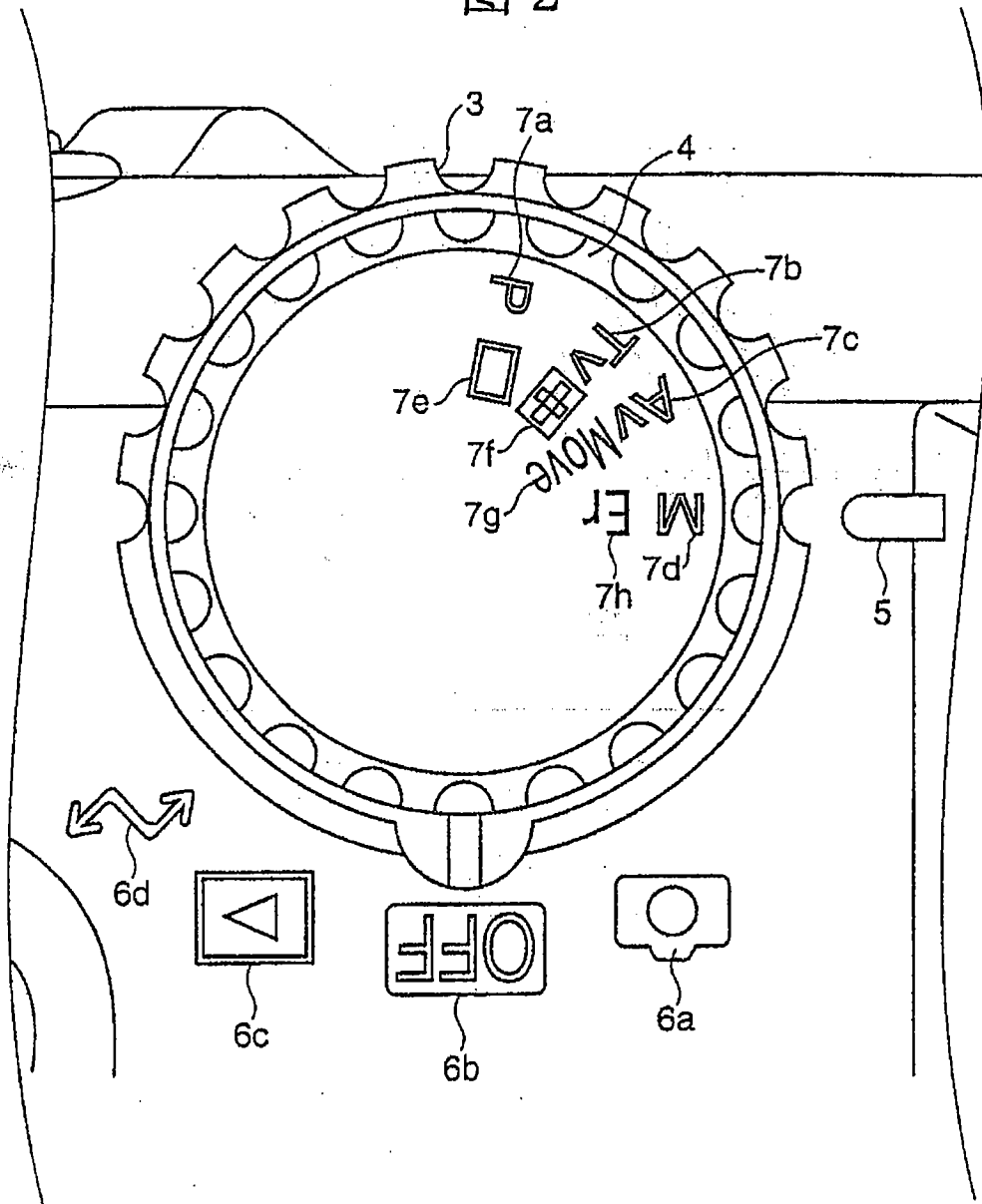


图 1B



01.10.08

图 2



01.10.08

图 3A

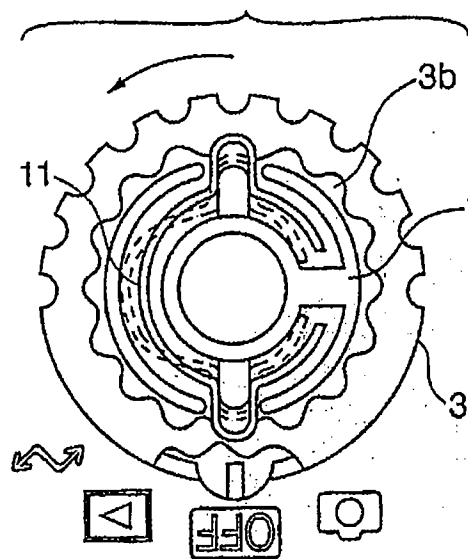


图 3B

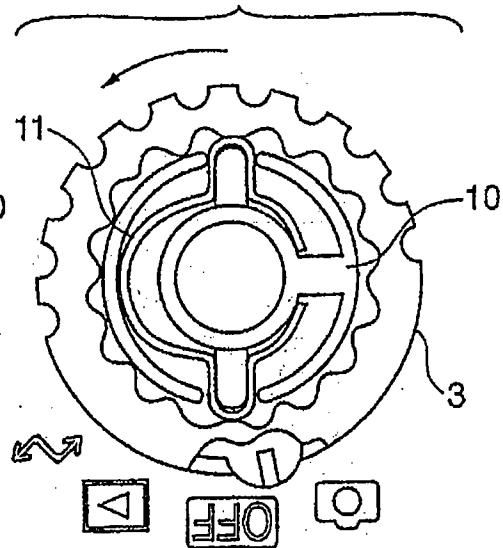
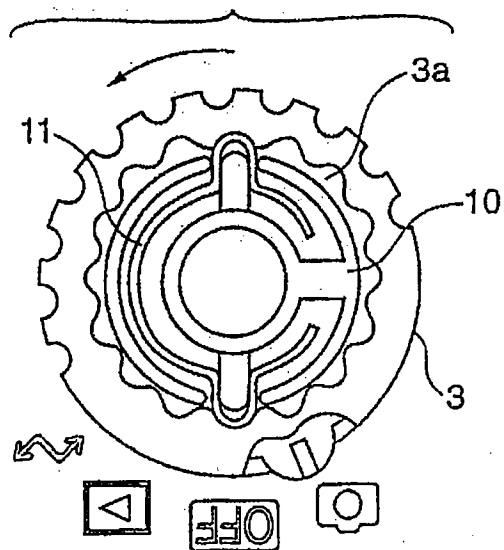
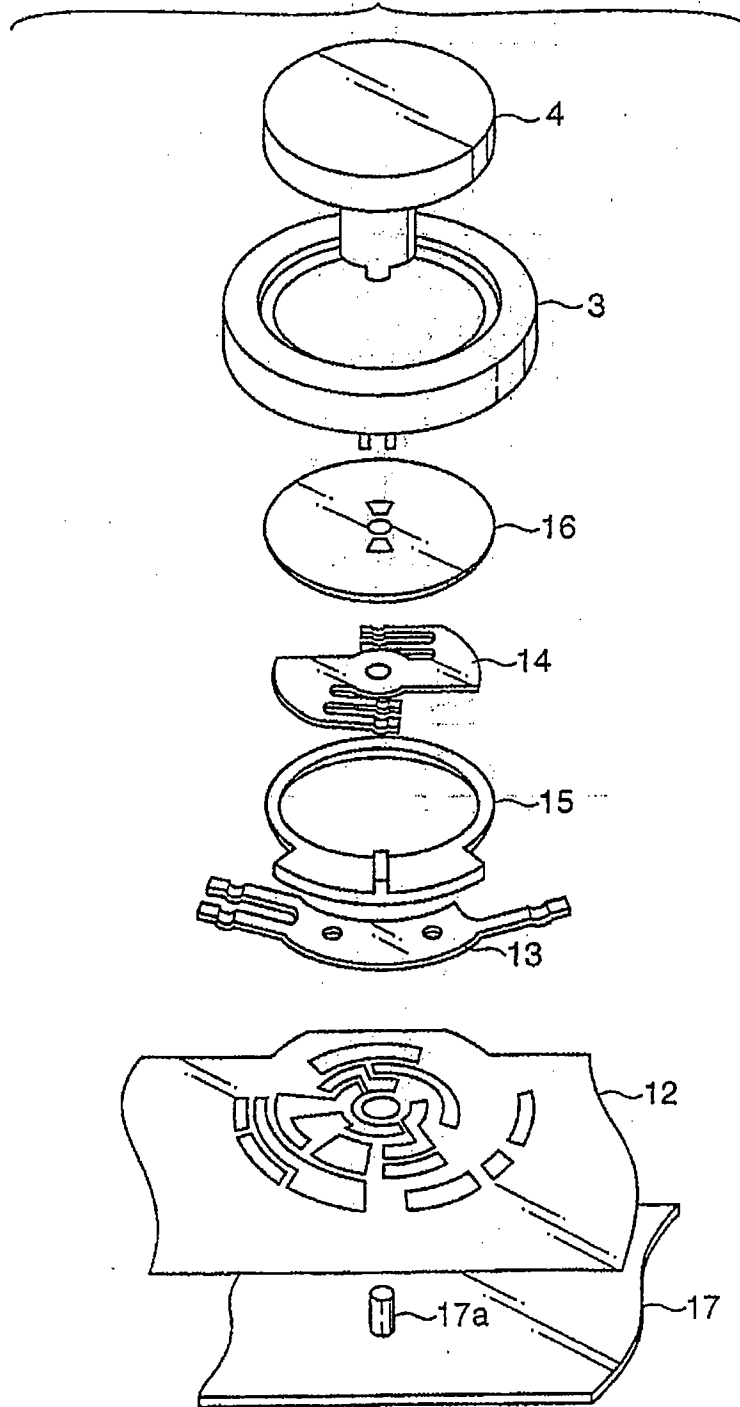


图 3C



01.10.08

图 4



01.10.03

图 5A

第一字盘的位置：非工作状态

连接关系：A, C, D, G

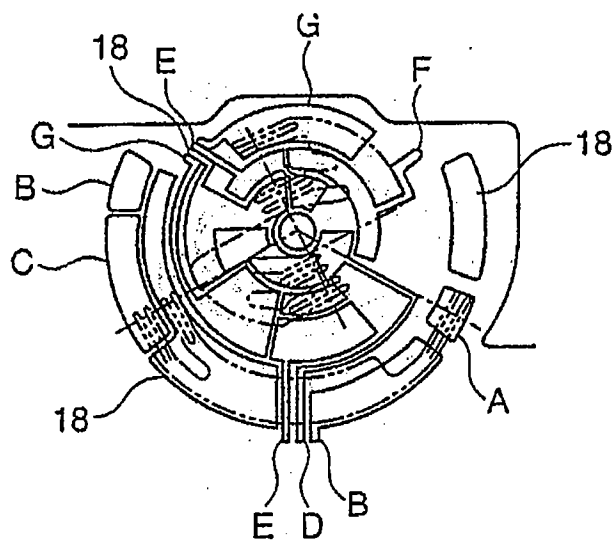


图 5B

第一字盘位置：拍摄模式

连接关系：D, G

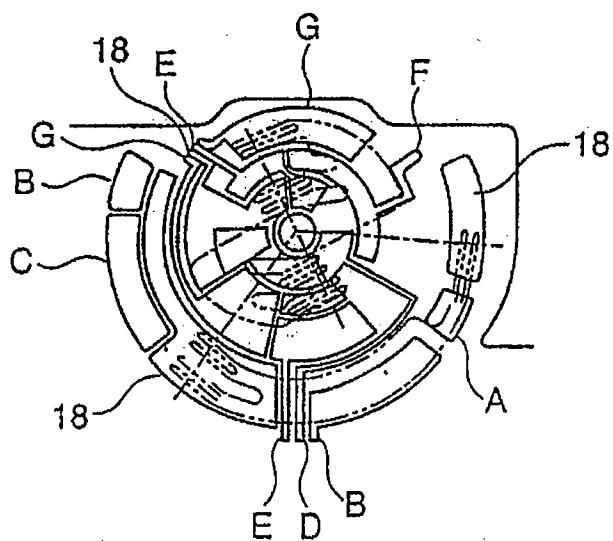


图 6

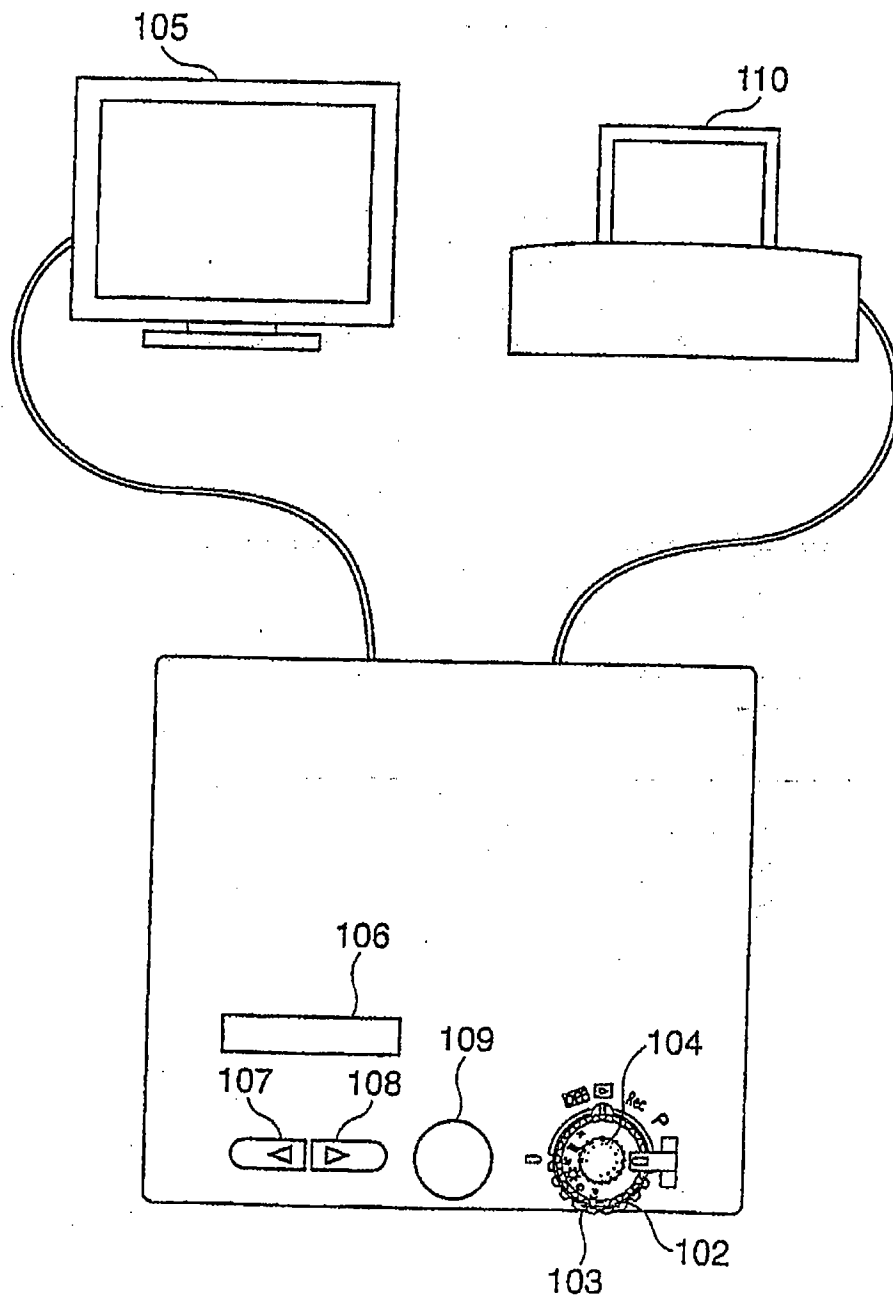
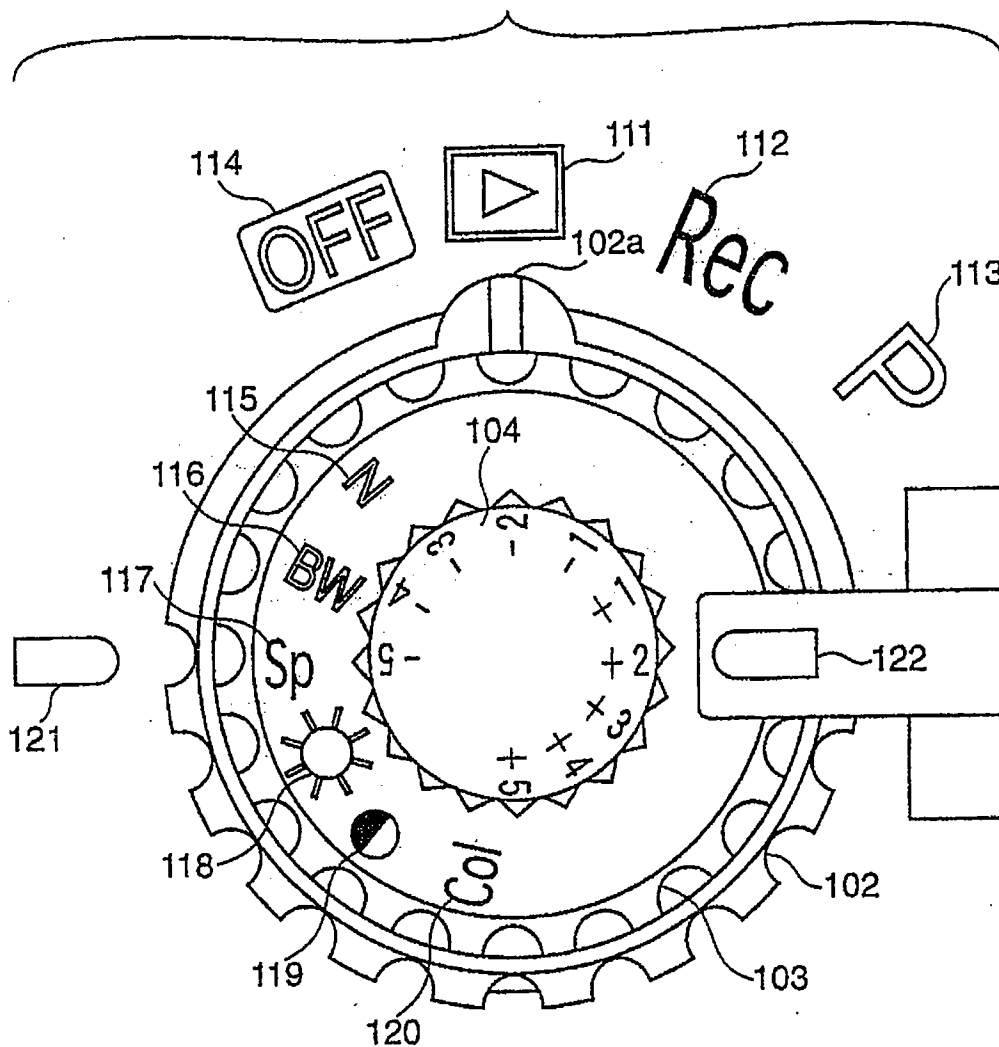


图 7



01:10:08

图8

工作模式	连接关系
非工作状态	A, C, D, G
程控模式	D, G
TV优先模式	D, E, G
AV优先模式	E, G
手动模式	G
单一回放模式	B, C, D, G
多重回放模式	B, C, D, E, G
动态图象回放模式	B, C, E, G
删除模式	B, C, G
通讯模式	B(D至G任意设置)

图 9A

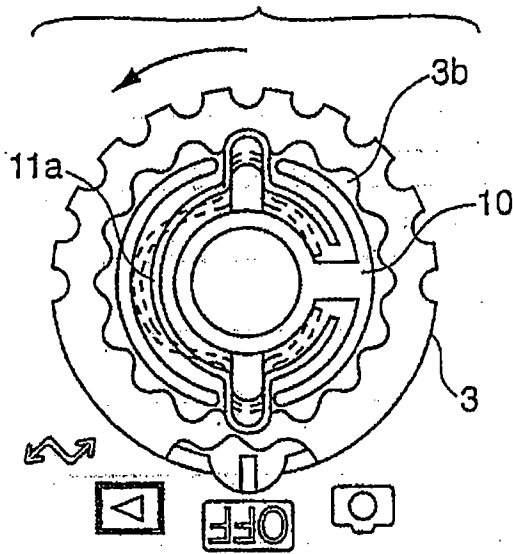


图 9B

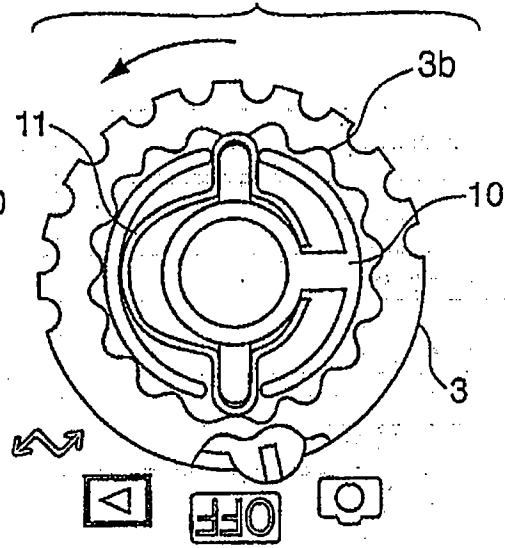


图 9C

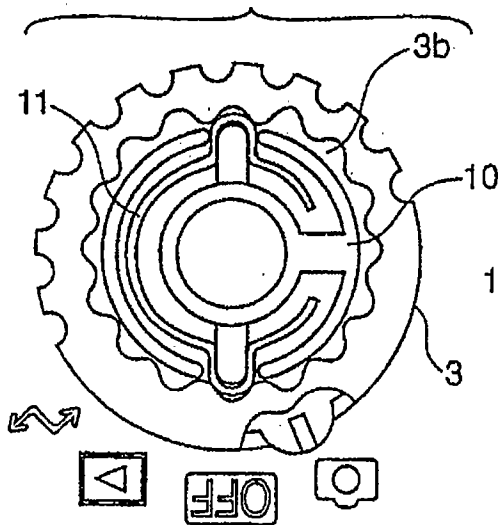


图 9D

